



**STATE OF WISCONSIN  
DEPARTMENT OF TRANSPORTATION**

# **Inspection Report for P-40-886 ( City Bridge 105 )**

**E MICHIGAN ST over MILWAUKEE RIVER  
May 06,2014**



Type	Prior	Frequency (mos)	Performed
Initial / Inventory		0	X
Routine	05-06-14	24	X
Fracture Critical	04-22-13	24	
Interim	04-22-13	0	
Uw-Dive	06-11-13	60	
Underwater V Probe	03-31-06	24	
SI&A	05-10-12	48	

Latitude   
Longitude

Owner   
Maintainer

## **Time Log**

Hours 2	Minutes 30	Team members Holly Rutenbeck
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## **Team members**

	Name	Number	Signature	Date
Inspector	Washington, James	2523		
Reviewer				

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**Identification & Location**

Feature On: E MICHIGAN ST	Section Town Range: S29 T07N R22E	Structure Number: <b>P-40-886</b>
Feature Under: MILWAUKEE RIVER	County: MILWAUKEE(40)	
Location 0.1M W JCT USH 18	Municipality: CITY-MILWAUKEE(40251)	Structure Name: City Bridge 105

**Geometry**

measurements in feet, except where noted

Approach Roadway Width: 56	Bridge Roadway Width: 48.0	Total Length: 178.6
Approach Pavement Width: 56	Deck Width: 72.0	Deck Area (sq ft): 12859

**Traffic**

	Lanes	ADT	ADT year	Traffic Pattern
On	4	10738	2012	TWO WAY TRAFFIC
Under	0			NO TRAFFIC

**Capacity**

**Load Rating**

Inventory rating: HS20	Overburden depth (in): 0.0		Controlling:
Operating rating: HS28	Deck surface material: OTHER	Re-rate for capacity (Y/N):	Control location:
Posting:	Re-rate notes:		
Last rating date:			

**Hydraulic**

**Classification**

Scour Critical Code(113): (8) STABLE-ABOVE TOP FOOTING	Q100 (ft3/sec): 15000	
Scour POA on file:	POA date:	Velocity (ft/sec): 0.0
		Sufficiency #: 61.0

**Span(s)**

Span #	Material	Configuration	Depth (in)	Length (ft)	Main
1	STEEL	DECK GIRDER		47.7	
2	STEEL	VERTICAL LIFT		68.0	Y
3	STEEL	DECK GIRDER		48.7	

**Expansion joint(s)**

**Temperature:**

Joint #	Location	Type	Last inspection date	Last measure (in)	New measure (in)
1	WEST ABUTMENT	T-30SA	04-22-13	10.8	9.0
2	WEST PIER	STEEL2	04-22-13	2.1	2.1
3	EAST PIER	STEEL2	04-22-13	2.2	2.2
4	EAST ABUTMENT	T-30SA	04-22-13	10.3	10.5

**Vertical Clearance**

	Measurement file (ft)	File Date	Measurement new (ft)
Highway Minimum Under Cardinal			
Highway Minimum Under Non-Cardinal			
Highway Minimum On			
Railroad Minimum Under			

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**Elements**

Chk	Element	Protect System	Defect	Description	UOM	Total	Quantity in Condition State			
							1	2	3	4
X	12			Reinforced Concrete Deck	SF	7,278	7,264	14	0	0
				Concrete deck at approach spans.						
			1080	Delamination - Spall - Patched Area	SF		0	14	0	0
				<b>Minor spalls and delaminations at the soffit at the west approach span.</b>						
		8000		Wearing Surface (Bare)	SF	4,852	4,272	580	0	0
			3210	Debonding/Spall/Patched Area/Pothole	SF		0	580	0	0
				<b>Several large areas of delaminations at the west approach span, determined by chain dragging. Delaminated areas at the east approach span. Several asphalt patches in the deck. See attached sketch.</b>						
X	28			Steel Deck With Open Grid	SF	2,616	0	0	2,616	0
				Steel deck at lift span.						
			1000	Corrosion	SF		0	0	2,616	0
				<b>Entire deck in condition state 3 due to heavy corrosion on the deck. Several riveted bars have holes corroded through. Plates installed at southeast corner of the deck over the broken bars. See attached sketch.</b>						
X	29			Steel Deck With Concrete Filled Grid	SF	840	840	0	0	0
				Steel plate with asphalt fill over machinery at lift span.						
		8511		AC Overlay	SF	840	0	435	405	0
			3220	Crack (Wearing Surface)	SF		0	435	405	0
				<b>Asphalt has multiple cracks, patches and rutting. See attached sketch and photos.</b>						
X	107			Steel Open Girder	LF	1,557	993	556	8	0
				<b>Element 107 includes:</b>						
				<b>Lift span girders, labeled G1 to G8, from south to north: 544 lineal feet.</b>						
				<b>20 approach span girders (referred to as stringers on 1977 drawings), labeled S1 through S10, from south to north: 1013 lineal feet.</b>						
			1000	Corrosion	LF		0	556	8	0
				<b>Surface rust on all lift span girders. Rust initiating on the east approach span girders, but is insignificant. East end of all west approach girders are rusted, girders G2 through G5 are more heavily rusted.</b>						
		8516		Painted Steel	SF	34,670	6,934	26,002	1,734	0
			3440	Effectiveness (Steel Protective Coatings)	SF		0	26,002	1,734	0
				<b>Rust and paint failure on lift span members. Paint failures at floor beams, stringers, purlins and sidewalk members are more advanced.</b>						
X	113			Steel Stringer	LF	1,728	0	1,683	45	0
				<b>Element 113 includes:</b>						
				<b>Stringers at the lift span: 1,008 lineal feet.</b>						
				<b>Sidewalk stringers, curb channels and fascia channels: 720 lineal feet.</b>						
			1000	Corrosion	LF		0	1,679	45	0
				<b>Members are rusting, typical rusting is on the bottom third of the web and the top of the bottom flange. Stringer adjacent to third floor beam from the north at the east side of the bridge is more heavily rusted than the other stringers. Heavy corrosion on many of the sidewalk stringers.</b>						
			1900	Distortion	LF		0	4	0	0
				<b>The top of the webs are bent at the fifth, sixth and seventh stringers from the north, visible at the west end of the lift span when the span is up. The eighth stringer is slightly bent.</b>						
X	152			Steel Floor Beam	LF	457	0	457	0	0
				<b>Element 152 includes:</b>						
				<b>Floor beams at the lift span, labeled FB1 through FB7, from west to east. FB1 and FB7 are the jacking beams, and are conservatively considered fracture critical.</b>						
			1000	Corrosion	LF		0	457	0	0
				<b>All members are rusting. Bottom of jacking beams are rusted. Rusting on beams at gusset plate connection to the lateral bracing.</b>						
X	8170			Other Primary Structural Members	LF	2,763	0	2,741	22	0

			<b>Element includes:</b> Purlin channels at the lift spans supporting the deck. Transverse double channels at the sidewalk.					
		1000	Corrosion	LF	0	2,741	22	0
			<b>All purlins are rusted. Purlins have 100% section loss near the east pier at the center of the bridge. Three of the same purlins have additional areas of 100% section loss south of the center of the bridge. See attached sketch.</b>					
X	202		Steel Column	EA	4	0	4	0
			<b>Element 202 refers to the lifting legs.</b>					
		1000	Corrosion	EA	0	4	0	0
			<b>Lifting legs, guide rails and cable brackets for the counterweight cables are rusted.</b>					
X	205		Reinforced Concrete Column	EA	8	8	0	0
X	210		Reinforced Concrete Pier Wall	LF	343	313	30	0
			<b>Element 210 refers to the pier wall (includes the inside of the pit walls). Does not include the pier cap or columns supporting the approach span girders (see Elements 234 and 205). Pier 1 is the west pier. Pier 2 is the east pier.</b>					
		1130	Cracking (RC)	LF	0	30	0	0
			<b>Vertical cracks at pier walls. Both sides of the concrete cap is cracked, spalled and delaminated. Several cracks on the beam seats at both piers. The west counterweight corbel at the north end of the east pier is cracked.</b>					
X	215		Reinforced Concrete Abutment	LF	162	142	20	0
		1130	Cracking (RC)	LF	0	20	0	0
			<b>Medium sized vertical cracks both abutments.</b>					
X	234		Reinforced Concrete Pier Cap	LF	126	91	27	8
			<b>Element 234 refers to the concrete beam supporting the approach spans at the pier (not the pier wall supporting the lift span).</b>					
		1080	Delamination - Spall - Patched Area	LF	0	3	0	0
			<b>Two-foot long spall at the east concrete beam, with delaminations around the spall. Spall with exposed rebar near the center of the west concrete beam.</b>					
		1130	Cracking (RC)	LF	0	24	8	0
			<b>East pier has large area of cracking with delamination; shoring the concrete beam is advised. Several vertical and horizontal cracks at the west concrete beam.</b>					
X	304		Open Expansion Joint	LF	144	144	0	0
			<b>Finger joint plates at lift span. Lift span does not rest level when not in operation.</b>					
X	306		Other Joint	LF	144	72	72	0
			<b>Fel-span joints at the abutments.</b>					
		2360	Adjacent Deck or Header Damage	LF	0	72	0	0
			<b>Anchor concrete is spalled and delaminated in several areas.</b>					
X	311		Movable Bearing	EA	28	0	28	0
			<b>Element 311 includes:</b> Eight expansion bearings for the lift span at pier 2. Ten expansion bearings at each abutment for the approach spans (20 total). <b>Several lift span bearings do not rest fully on the plates when the lift span is down.</b>					
		1000	Corrosion	EA	0	28	0	0
			<b>All bearings are rusted. Pack rust forming between bearing plate and shim plates.</b>					
X	313		Fixed Bearing	EA	28	0	28	0
			<b>Element 313 includes:</b> Eight fixed bearings for the lift span at pier 1. Ten fixed bearings at each pier for the approach spans (20 total). Bearing shims are uneven at the second girder from the south (girder 2) at the lift span. Northernmost girder of the lift span (girder 7) does not sit on the bearing at the east pier.					
		1000	Corrosion	EA	0	28	0	0
			<b>All bearings are rusted.</b>					
X	330		Metal Bridge Rail	LF	380	0	380	0
		1000	Corrosion	LF	0	380	0	0
			<b>Base plates rusted. Rusting at the southwest corner of the bridge at the post and the expansion joint in the railing.</b>					

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**Assessments**

Chk	Element	Description	UOM	Total	Quantity in Condition State			
					1	2	3	4
X	9004	Drainage - Deck	EA	2	0	0	2	0
		Gutters beneath the lift span finger <b>joint</b> plates are full of debris. <b>Gutters are heavily rusted.</b>						
X	9009	Sidewalk	EA	2	0	2	0	0
		<b>Concrete at the lift span, fiberglass plates at the lift span.</b>						
		<b>Concrete sidewalk at northeast has several hairline to moderate sized transverse cracks. Southwest sidewalk has transverse cracks.</b>						
X	9020	Movable Bridge - Counterweight	EA	2	2	0	0	0
X	9021	Movable Bridge - Cables	EA	36	36	0	0	0
		<b>Eight transverse equalizing cables, eight longitudinal equalizing cables, 20 counterweight cables. Cables have surface rust.</b>						
X	9167	Steel Diaphragm	EA	36	0	36	0	0
		Members are rusting <b>at the west approach. Rust initiating at the east approach.</b>						
X	9169	Lateral Bracing	EA	6	0	6	0	0
		<b>Rust on all lateral bracing members and gusset plates.</b>						
X	9290	Dolphin or Fender System	EA	2	0	2	0	0
		<b>Timber walers at both piers facing the navigable channel. Walers are split and decaying, but effective.</b>						
X	9322	Approach Roadway - Concrete (non-structural)	EA	2	0	2	0	0
		Approaches are settling. <b>Several cracks and patches.</b>						

**NBI Ratings**

	File	New
Deck	4	4
Superstructure	6	5
Substructure	6	6
Culvert	N	N
Channel	7	7
Waterway	8	8

**Structure Specific Notes**

Verify if any openings for marine traffic are expected prior to using the reachall at the lift span.
Refer to movable inspection form for condition of movable parts (sheaves, drums, bumper beam, bumper beam guide rail columns, etc.).

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**Inspection Specific Notes**

Lift span superstructure steel is heavily rusted throughout. Northwest download transverse equalizing sheave does not rotate. Cables recently replaced. Southeast longitudinal sheave recently replaced.

**Inspector Site-Specific Safety Considerations**

**Structure Inspection Procedures**

**Deck:** Walk deck, observe and document any spalls, cracks or delaminations in concrete, broken bars or rusting at steel deck. Note the condition of the fiberglass plates at the lift span sidewalk. Document condition of approaches.

**Reach-all:** Use reach-all to inspect the inaccessible areas over the river. Observe and document condition of structural steel, bearings, underside of deck, and piers. Verify that bearings rest on the plates.

**Pits and Pier Level:** Inspect the underside of the approach span deck, girders and diaphragms and abutments from the pier walkway. Inspect the concrete beams and columns supporting the approach span and the pier walls. Enter the pits and note the condition of the pit walls. Note the condition of the lift legs and the lower sheaves and counterweight cable brackets. Verify that the sump pumps are working and that there is no water in the pits. Verify that there are no hydraulic leaks; direct bridge maintenance to properly dispose if hydraulic fluid is in the pit. Inspect base of hydraulic ram, look for leaks in seals.

**Movable:** Perform two openings and inspect machinery from each pit. Observe proper rotation of all sheaves and drums. Note condition of corbels and angles supporting sheave and drum bearings. Note condition of cables and anchors. Check roller bearings at guide rails on lifting legs for excessive lateral movement. Observe condition of hydraulic rams. Verify that gate arms are functioning and level. Check for proper operation of the bumper beam.

**Document if bridge operated on standard or emergency power. Ask operator if there were any issues with the HPU or any other operational issues. Verify if spring maintenance has been performed.**

**Special Requirements**

	Chk	Comments
Traffic Control		
Access Equipment	X	Reachall
Other		

**Construction History**

Year	Work Performed	FOS id
1978	NEW STRUCTURE	

**Maintenance Items History**

Item	Recommended by	Status	Status change	Year completed
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**Maintenance Items**

Item	Priority	Recommended by	Status	Status change
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Document Comment/Description

Movable
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File: p40-886\_14\_0d1.pdf

Document Comment/Description

Photos

File: p40-886\_14\_Rd1.pdf



Document Comment/Description

Sketches
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File: p40-886\_14\_Rd2.pdf

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